EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to the applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

2. Authorization for this examiner's amendment was given in a telephone interview with Mr. Philip Lyren on 6/12/2008.

3. Please replace all of the claims with the following of applicant's amended claims.

1. A method of performing online computer maintenance on at least one node, the method comprising:

running a virtual machine monitor;

running a first operating system instance on the virtual machine monitor;

configuring hardware to trap instructions executed by the first operating system instance;

simulating trapped instructions with the virtual machine monitor;

running a second operating system instance on the virtual machine monitor as a substitute for the first operating system instance; and

performing the maintenance with respect ~~to one of~~ to the first ~~and second~~ operating system instance~~s~~ while using the ~~other of the first and~~ second operating system instance~~s~~, wherein the maintenance includes servicing additional hardware or software, and the virtual machine monitor shields the first operating system instance from the additional hardware or the software as the additional hardware or the software is being added by configuring the hardware to trap instructions and by simulating the trapped instruction with the virtual machine monitor.

2. The method of claim 1, wherein the second operating system instance is run as a substitute by migrating at least one application from the first operating system instance to the second operating system instance, and using the migrated applications on the second operating system instance.

3. The method of claim 1, further comprising shutting down the first operating system instance after the second operating system instance has been run as a substitute for the first operating system instance.

4. The method of claim 1, wherein the maintenance includes hardware servicing; and wherein the second operating system instance is run without a dependency on hardware to be serviced.

5. The method of claim 4, wherein the servicing includes removing hardware from the

at least one node.

6. The method of claim 4, wherein the virtual machine monitor is used to hide hardware to be serviced from the second operating system instance during bootup of the second operating system instance.

7. The method of claim 4, wherein the virtual machine monitor releases its own dependencies on hardware prior to removal.

8. The method of claim 1, wherein the maintenance includes adding the hardware; wherein the virtual machine monitor discovers the hardware; and wherein the virtual machine monitor shields the first operating system instance from the hardware as the hardware is being added.

9. The method of claim 8, wherein the hardware is added before the second operating system instance is booted; and wherein the second operating system instance is allowed during bootup to see the hardware.

10. The method of claim 1, wherein applications running on the first operating system instance are migrated to the second operating system instance; and wherein software maintenance is performed.

11. The method of claim 10, further comprising shutting down one of the first and second operating system instances after the applications have been migrated.

12. The method of claim 1, wherein the second operating system instance is an upgraded operating system; and wherein applications running on the first operating system instance are migrated to the second operating system instance.

13. The method of claim 1, wherein the maintenance includes modifying the second operating system instance; and wherein the method further includes migrating applications running on the first operating system instance to the second operating system instance.

14. The method of claim 1, further comprising migrating applications from the first operating system instance to the second operating system instance before the maintenance is performed; migrating the applications from the second operating system instance back to the first operating system instance after the maintenance has been performed; and shutting down the second operating system instance following the application migration to the first operating system instance.

15. The method of claim 1, wherein a first application instance is running on the first operating system instance before the maintenance is performed; and wherein the maintenance includes running a second application instance on the second operating

system instance, modifying the second application instance, and cutting over from the first application instance to the modified second application instance.

16. The method of claim 1, wherein the virtual machine monitor allows at least one of the first and second operating system operating system instances to have direct control over at least one of a processing unit, memory and I/O of the at least one node.

17. The method of claim 1, wherein the first operating system instance is booted prior to running the virtual machine monitor; and wherein the virtual machine monitor is interposed beneath the first operating system instance when maintenance is to be performed.

18. The method of claim 1, wherein at least one of a processing unit, memory and I/O is devirtualized after the maintenance has been performed.

19. The method of claim 1, wherein a single processor is used to run the virtual machine monitor and the first and second operating system instances.

20. The method of claim 1, wherein a single node is used to run the virtual machine monitor and the first and second operating system instances.

21. A node comprising a processing unit and memory for the processing unit, the

memory encoded with a virtual machine monitor and an operating system, the virtual machine monitor running a second instance of the operating system when a first instance of the operating system is already running in the node, the second instance being run when maintenance is to be performed, the second instance being a substitute for the first instance, the virtual machine monitor allowing the maintenance to be performed with respect to ~~one of~~ the first instance while using the ~~other of~~ second instance wherein the virtual machine monitor configures hardware to trap privileged instructions to create an illusion that the first instance has control of the hardware, wherein the maintenance includes servicing additional hardware or software, and the virtual machine monitor shields ~~one of the operating system~~ the first instance from the additional hardware or the software as the additional hardware or the software is being added by configuring the hardware to trap instructions and by simulating the trapped instruction with the virtual machine monitor.

22. The node of claim 21, wherein the second instance is run as a substitute by migrating at least one application from the first instance to the second instance, and using the at least one application on the second instance.

23. The node of claim 21, wherein the virtual machine monitor shuts down the first instance after the second instance has been run as a substitute for the first instance.

24. The node of claim 21, wherein the virtual machine monitor is used to hide hardware

to be serviced from the second instance during bootup of the second instance.

25. The node of claim 21, wherein the maintenance includes adding hardware; wherein the virtual machine monitor discovers the added hardware; and wherein the virtual machine monitor shields the first instance from the added hardware as the added hardware is being added.

26. The node of claim 25, wherein the added hardware is added before the second instance is booted; and wherein during bootup the virtual machine monitor allows second instance to see the added hardware.

27. The node of claim 21, wherein applications running on the first instance are migrated to the second instance; and wherein software maintenance is performed.

28. The node of claim 21, wherein the maintenance includes modifying the second instance; and wherein applications running on the first instance are migrated to the second instance.

29. The node of claim 21, wherein applications are migrated from the first instance to the second instance before the maintenance is performed; the applications are migrated from the second instance back to the first instance after the maintenance has been performed; and wherein the virtual machine monitor shuts down the second instance

after the applications are migrated to the first instance.

30. The node of claim 21, wherein the virtual machine monitor allows at least one of the first and second instances to have direct control over at least one of a processing unit, memory and I/O of the at least one node.

31. The node of claim 21, wherein the first instance is booted prior to running the virtual machine monitor; and wherein the virtual machine monitor is interposed beneath the first instance when maintenance is to be performed.

32. The node of claim 21, wherein the virtual machine monitor devirtualizes at least one of a processing unit, memory and I/O after the maintenance has been performed.

33. An article for a processing unit of a node, the article comprising computer memory encoded with a virtual machine monitor for running first and second instances of an operating system, the second instance being run when maintenance on the node is to be performed, the second instance being a substitute for the first instance, the virtual machine monitor allowing the maintenance to be performed with respect to ~~one of the first and second~~ the first instance while using ~~the other of the first and~~ the second instance, wherein the virtual machine monitor configures hardware to trap instructions to create an illusion that the first instance has control of the hardware, wherein the maintenance includes servicing additional hardware or software, and the virtual

machine monitor shields ~~one of~~ the first operating system instance from the additional hardware or the software as the additional hardware or the software is being added by configuring the hardware to trap instructions and by simulating the trapped instruction with the virtual machine monitor.

34. The article of claim 33, wherein the virtual machine monitor shuts down the first instance after the second instance has been run as a substitute for the first instance.

35. The article of claim 33, wherein the virtual machine monitor is used to hide hardware to be serviced from the second instance during bootup of the second instance.

36. The article of claim 33, wherein the maintenance includes adding hardware; wherein the virtual machine monitor discovers the added hardware; and wherein the virtual machine monitor shields the first instance from the added hardware as the added hardware is being added.

37. The article of claim 36, wherein the added hardware is added before the second instance is booted; and wherein during bootup the virtual machine monitor allows the second instance to see the added hardware.

38. The article of claim 33, wherein the virtual machine monitor causes applications

running on the first instance to be migrated to the second instance in order to perform software maintenance.

39. The article of claim 33, wherein the maintenance includes modifying the second instance; and wherein the virtual machine monitor causes applications running on the first instance to be migrated to the second instance.

40. The article of claim 33, wherein the virtual machine monitor causes applications to be migrated from the first instance to the second instance before the maintenance is performed; wherein the virtual machine monitor causes the applications to be migrated from the second instance back to the first instance after the maintenance has been performed; and wherein the virtual machine monitor shuts down the second instance after the applications are migrated to the first instance.

41. The article of claim 33, wherein the virtual machine monitor allows at least one of the first and second instances to have direct control over at least one of a processing unit, memory and I/O of the at least one node.

42. The article of claim 33, wherein first instance is booted prior to running the virtual machine monitor; and wherein the virtual machine monitor is interposed beneath the first instance when maintenance is to be performed.

43. The article of claim 33, wherein the virtual machine monitor can devirtualize at least one of a processing unit, memory and I/O after the maintenance has been performed.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MengYao Zhe whose telephone number is 571-272-6946. The examiner can normally be reached on Monday Through Friday, 10:00 - 8:00 EST. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached at 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Meng-Ai An/

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